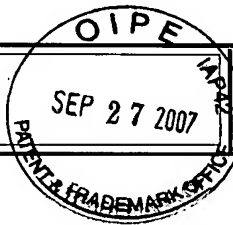


TRANSMITTAL OF APPEAL BRIEF (Large Entity)Docket No.
R.304253

In Re Application Of: Markus OHNMACHT et al.

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/526,308	March 2, 2005	T. McGraw	02119	3752	3846

Invention: Fuel Injection Valve for Internal Combustion Engines

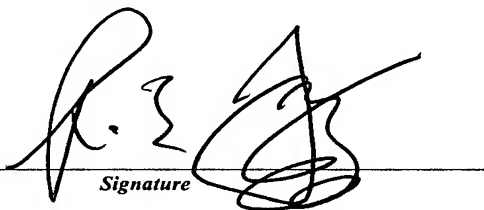
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July 27, 2007

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Dated: September 27, 2007

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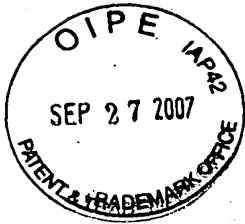
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re patent application of

Markus OHNMACHT et al.

Before the Board of Appeals

Serial No. 10/526,308

Art Unit: 3752

Filed: March 2, 2005

Examiner: T. McGraw

For: Fuel Injection Valve for Internal Combustion Engines

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Date: September 27, 2007

APPELLANT'S BRIEF (37 CFR 41.37)

Sir:

This Brief is filed in support of the Notice of Appeal filed on July 27, 2007.

The fee for this Appeal Brief of \$500 should be charged to Deposit Account No. 07-2100
by the attached deposit account form, submitted in duplicate.

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I - REAL PARTY IN INTEREST

The real party in interest in this appeal is:

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II - RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal, there are no such appeals or interferences. None

III - STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION - Twenty-three (23)

Claims in the application are: 25-27, 29-31 and 35-51.

B. STATUS OF ALL THE CLAIMS

1. Claims canceled: 1-24, 28 and 32-34.
2. Claims withdrawn from consideration but not canceled: 26, 27, 29, 31, 37, 39-47 and 49.
3. Claims pending: 25-27, 29-31 and 35-51.
4. Claims allowed: None.
5. Claims rejected: 25, 30, 35, 36, 38, 48, 50 and 51.

C. CLAIMS ON APPEAL

The claims on appeal are: 25, 30, 35, 36, 38, 48, 50 and 51.

IV - STATUS OF AMENDMENTS

A first amendment under 37 CFR 1.116 was filed on May 24, 2007. In an Advisory Action mailed July 25, 2007, the Examiner indicated that the amendment would not be entered for purposes of appeal.

A second amendment under 37 CFR 1.116 was filed prior to the date the present brief was filed. This second amendment under 37 CFR 1.116 cancels claim 28 and corrects a typographical error in claim 25. This brief presumes that the second amendment under 37 CFR 1.116 has been entered for purposes of appeal.

V - SUMMARY OF CLAIMED SUBJECT MATTER

In the following summary, all references to pages and lines can be found in the original English-language specification filed on March 2, 2005. However, it should be noted that the original English-language specification contained a number of minor errors that were corrected by the preliminary amendment also filed on March 2, 2005. The claimed subject matter is illustrated in appellants' Fig. 5, the elected species.

The Board's and the examiner's attention is directed to a typographical error in claim 25, as presented in the amendment filed on October 10, 2006. In order to correct the typographical error, a second amendment under 37 C.F.R. 1.116 has been filed prior to filing this brief. The copy of the claims reproduced in the attached "Claims Appendix" presumes that the second amendment under 37 C.F.R. 1.116 has been entered for purposes of appeal.

Independent claim 25 is directed to a fuel injection valve for internal combustion engines, the valve comprising

a valve body (1) having a bore (3, Fig. 1) defined on its end toward the combustion chamber of the engine by a conical valve seat (12) (p. 7, ll. 16-18),

a pistonlike valve needle (5) disposed longitudinally displaceably in the bore (3), the valve needle (5) having a valve sealing face (10, Fig. 1) (p. 8, ll. 1-6) that includes two conical faces (20; 22), on its end toward the combustion chamber the second conical face (22) disposed on the combustion chamber side of the first conical face (20) (p. 8, l. 25-p. 9, l. 2),

an annular groove (25) extending between the conical faces (20; 22), the end of the annular groove (25) facing away from the combustion chamber acting as a sealing edge (27)

upon contact of the valve sealing face (10) with the valve seat (12), (p. 9, ll. 2-5) and

a plurality of recesses (35, Fig. 2) embodied on the valve sealing face (10), the recesses (35) hydraulically connecting the annular groove (25) with a portion of the second conical face (22) located on the combustion chamber side of the annular groove (25) (p. 9, ll. 20-24), wherein the recesses (35) are embodied as a plurality of elongated grooves (38), and the elongated grooves (38) extend beyond the injection openings (14) (p. 11, l. 24-p. 12, l. 7 and Fig. 5).

Claim 35 depends from claim 25 and further requires that the elongated grooves (38) have a width (b) of 5 μm to 50 μm (p. 11, ll. 10, 11).

Claim 38 depends from claim 25 and further requires that the depth (t) of the elongated grooves (38) is from 1 to 10 times their width (b) (p. 11, ll. 14-16).

Independent claim 50 is directed to a fuel injection valve for internal combustion engines, the valve comprising

a valve body (1) having a bore (3, Fig. 1) defined on its end toward the combustion chamber of the engine by a conical valve seat (12) (p. 7, ll. 16-18),

a pistonlike valve needle (5) disposed longitudinally displaceably in the bore (3), the valve needle (5) having a valve sealing face (10, Fig. 1) (p. 8, ll. 1-6) that includes two conical faces (20; 22), on its end toward the combustion chamber the second conical face (22)

disposed on the combustion chamber side of the first conical face (20) (p. 8, l. 25-p. 9, l. 2),

an annular groove (25) extending between the conical faces (20; 22), the end of the annular groove (25) facing away from the combustion chamber acting as a sealing edge (27) upon contact of the valve sealing face (10) with the valve seat (12), (p. 9, ll. 2-5) and

a plurality of recesses (35, Fig. 2) embodied on the valve sealing face (10), the recesses (35) hydraulically connecting the annular groove (25) with a portion of the second conical face (22) located on the combustion chamber side of the annular groove (25) (p. 9, ll. 20-24),

wherein the recesses (35) are embodied as a plurality of elongated grooves (38) (p. 11, l. 24-p. 12, l. 7 and Fig. 5), and

wherein the end of the elongated grooves (38) facing away from the combustion chamber is located inside the annular groove (25) (p. 11, ll. 25, 26).

Independent claim 51 is directed to a fuel injection valve for internal combustion engines, the valve comprising

a valve body (1) having a bore (3, Fig. 1) defined on its end toward the combustion chamber of the engine by a conical valve seat (12) (p. 7, ll. 16-18),

a pistonlike valve needle (5) disposed longitudinally displaceably in the bore (3), the valve needle (5) having a valve sealing face (10, Fig. 1) (p. 8, ll. 1-6) that includes two conical faces (20; 22), on its end toward the combustion chamber the second conical face (22) disposed on the combustion chamber side of the first conical face (20) (p. 8, l. 25-p. 9, l. 2),

an annular groove (25) extending between the conical faces (20; 22), the end of the annular groove (25) facing away from the combustion chamber acting as a sealing edge (27) upon contact of the valve sealing face (10) with the valve seat (12), (p. 9, ll. 2-5) and

a plurality of recesses (35, Fig. 2) embodied on the valve sealing face (10), the recesses (35) hydraulically connecting the annular groove (25) with a portion of the second conical face (22) located on the combustion chamber side of the annular groove (25) (p. 9, ll. 20-24),

wherein the recesses (35) are embodied as a plurality of elongated grooves (38) (p. 11, l. 24-p. 12, l. 7 and Fig. 5), and

wherein the elongated grooves (38) are microscopic grooves, whose depth (t) is less than 50 μm (p. 3, ll. 19, 20).

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VI - GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 25, 30 and 48 stand rejected under 35 U.S.C. 102(b) as anticipated by
Haeberer et al (WO 02/01066).

Claims 25, 35, 36, 38, 48, 50 and 51 stand rejected under 35 U.S.C. 103(a) as
unpatentable over Haeberer et al (WO 02/01066) in view of Schorr et al (WO 02/064969).

VII - ARGUMENTS

In the following arguments, appellants' use US 6,892,965, the US equivalent of Haeberer et al (WO 02/01066), for an understanding of Haeberer et al (WO 02/01066) and US 7,011,265, the US equivalent of Schorr et al (WO 02/064969), for an understanding of Schorr et al (WO 02/064969). All references in the appellants' arguments to columns and lines can be found in the US equivalent documents.

A. The 35 U.S.C. 102(b) rejection of claims 25, 30 and 48

In the Final rejection, the examiner finds that Haeberer et al teaches a valve body 1 (Fig. 1), a bore 3 (Fig. 1), a conical valve seat 9 (Fig. 3), a piston valve needle 5 (Fig. 3) having a sealing face 30 (Fig. 3) that includes two conical faces 32 (Fig. 3), one of the conical faces 32 being disposed on the combustion chamber side of "the first conical face (30)," an annular groove 35 (Fig. 3) extending "between the conical faces 32," the end of the annular groove 35 facing away from the combustion chamber acting as a sealing edge 38 (Fig. 3) upon contact of the sealing face 30 with the valve seat 9, a plurality of recesses 55 (Fig. 3) on the valve sealing face that hydraulically connect the annular groove 35 with a portion on the second conical face 32 located on the combustion chamber side of the annular groove and that the recesses 55 are embodied as a plurality of elongated grooves. See, Final Rejection, paragraph bridging pages 4 and 5.

The examiner also finds that Haeberer et al teaches "elongated grooves that extend beyond injection openings. Applicant is directed to Figures 4, 5 and 6 of Haeberer et al. (WO

02/01066) that clearly show elongated grooves. Applicant is further directed to Column 5, Lines 3-47 of Haeberer et al." See, Final Rejection, page 2, last paragraph. Since Haeberer et al. (WO 02/01066) does not contain columns, it is appellants' understanding that the examiner is referring to column 5, lines 3-47 of Haeberer et al (US 6,892,965).

Independent claim 25 requires that "the elongated grooves (38) extend beyond the injection openings (14)." This feature of appellants' claimed invention is clearly illustrated in Fig. 5. The appellants disagree with the examiner's finding that the elongated grooves 55 in Haeberer et al. extend beyond the injection openings 11.

Every finding of fact by the examiner must be supported by substantial evidence. The evidence relied on by the examiner consists of the teachings found in Haeberer et al, specifically, Figs. 4-6 and col. 5, ll. 3-47 of the specification.

The Board will undoubtedly read all of Haeberer et al's written description, inclusive of col. 5, ll. 3-47. The Board will see that Haeberer et al does not teach or suggest that the grooves 55 illustrated in Fig. 3 extend beyond injection openings 11. It is also pointed out that Figs. 4-6 do not even show the grooves 55.

To support a rejection of a claim under 35 U.S.C. 102(b), it must be shown that each element of the claim is found, either expressly described or under principles of inherency, in a single prior art reference. See Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), cert. denied, 465 U.S. 1026 (1984).

Haeberer et al does not expressly teach or inherently disclose a fuel injection valve of the type recited in claim 25, including a plurality of recesses embodied on a valve sealing face

of a pistonlike valve needle, the recesses hydraulically connecting an annular groove extending between conical faces on the pistonlike valve needle with a portion of the conical face located on the combustion chamber side of the annular groove, wherein the recesses are embodied as a plurality of elongated grooves, and the elongated grooves extend beyond the injection openings formed on a valve body. Thus, claim 25 and claims 30 and 48, dependent on claim 25, are not anticipated by Haeberer et al.

B. The 35 U.S.C. 103(a) rejection of claims 25, 35, 36, 38, 48, 50 and 51

Claims 25, 35, 36, 38 and 48

Haeberer et al does not expressly teach, inherently disclose or in any way suggest a fuel injection valve of the type recited in claim 25, including a plurality of recesses embodied on a valve sealing face of a pistonlike valve needle, the recesses hydraulically connecting an annular groove extending between conical faces on the pistonlike valve needle with a portion of the conical face located on the combustion chamber side of the annular groove, wherein the recesses are embodied as a plurality of elongated grooves, and the elongated grooves extend beyond the injection openings formed on a valve body.

The examiner cites Schorr et al (WO 02/064969) for a teaching that the size of grooves formed in a fuel injection valve is a result-effective variable. See, Final Rejection, page 5.

The examiner does not find that Schorr et al teaches that which the appellants' have previously pointed out is lacking in the teachings of Haeberer et al. Therefore, even if it

would have been obvious to combine the teachings of Schorr et al with the teaching in Haeberer et al, one of ordinary skill would not have arrived at the subject matter recited in claims 25, 35, 36, 38 and 48.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Neither Haeberer et al nor Schorr et al teaches or suggests a fuel injection valve of the type recited in claim 25, including a plurality of recesses embodied on a valve sealing face of a pistonlike valve needle, the recesses hydraulically connecting an annular groove extending between conical faces on the pistonlike valve needle with a portion of the conical face located on the combustion chamber side of the annular groove, wherein the recesses are embodied as a plurality of elongated grooves, and the elongated grooves extend beyond the injection openings formed on a valve body. Thus, claim 25 and claims 35, 36, 38 and 48, dependent on claim 25, are not rendered obvious by the combined teachings of Haeberer et al and Schorr et al.

Claim 50

The examiner further finds that Haeberer et al teaches that the ends of the grooves 55 are located within the annular groove 35. See, Final Rejection, paragraph bridging pages 4 and 5.

The appellants disagree with the examiner's finding that the ends of the grooves 55 in Haeberer et al are located inside or within the annular groove 35.

As illustrated in Fig. 3 and as described at col. 4, l. 64 through col. 5, l. 12, of Haeberer et al, the longitudinal grooves 55 connect the two annular grooves 35, 42 to one another and are disposed on the conical face formed between the annular groove 35 and the additional annular groove 42. The longitudinal grooves 55 extend along jacket lines of the conical face formed between the annular grooves 35, 42. There is no illustration or description in Haeberer et al of the ends of the grooves 55 being located inside or within the annular groove 35. To the contrary, Fig. 3 of Haeberer et al shows the ends of the grooves 55 facing away from the combustion chamber coinciding with the edge of the annular groove 35 nearest the combustion chamber.

The examiner fails to explain how the language “wherein the end of the elongated grooves (38) facing away from the combustion chamber is located inside the annular groove (25)” in claim 25 is construed so as to read on that taught by Haeberer et al.

It is well established that the Patent and Trademark Office ("PTO") determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction in light of the specification as it would be interpreted by one of ordinary skill in the art.

There is no special meaning given to the language “is located inside the annular groove” in the specification. Thus, one can turn to any English-language dictionary for the meaning of the adverb “inside”. The adverb “inside” means (given the context of how the word is used in appellants’ specification) “on or to the inside; within; in the inner part” (The World Book Dictionary, 1987, p. 1091).

Fig. 5 of appellants' specification illustrates the elected species. The description of Fig. 5 in appellants' specification, at para. 41, describes Fig. 5 as showing the end of the grooves 38 facing away from the combustion chamber as being located inside the annular groove 25. The Board should compare the description of Fig. 5 with the description of Fig. 3, which is described at para. 39 of the specification as illustrating grooves 38 having ends facing away from the combustion chamber coinciding with the "second edge" 29 of the groove 25.

In Fig. 3 of Haeberer et al, the ends of the grooves 55 facing away from the combustion chamber coincide with the edge of the annular groove 35 nearest the combustion chamber. Since the ends of the grooves 55 facing away from the combustion chamber do not extend past the edge of the annular groove 35 nearest the combustion chamber, it cannot be reasonably said that the ends of the elongated grooves 55 facing away from the combustion chamber are located inside the annular groove 35.

The examiner cites Schorr et al (WO 02/064969) for a teaching that the size of grooves formed in a fuel injection valve is a result-effective variable. See, Final Rejection, page 5.

The examiner does not find that Schorr et al teaches a plurality of recesses embodied on a valve sealing face of a pistonlike valve needle, the recesses hydraulically connecting an annular groove extending between conical faces on the pistonlike valve needle with a portion of the conical face located on the combustion chamber side of the annular groove, wherein the recesses are embodied as a plurality of elongated grooves, and the ends of the elongated

grooves facing away from the combustion chamber are located inside the annular groove.

Therefore, even if it would have been obvious to combine the teachings of Schorr et al with the teaching in Haeberer et al, one of ordinary skill would not have arrived at the subject matter recited in claim 50.

Neither Haeberer et al nor Schorr et al teaches or suggests a fuel injection valve of the type recited in claim 50, including a plurality of recesses embodied on a valve sealing face of a pistonlike valve needle, the recesses hydraulically connecting an annular groove extending between conical faces on the pistonlike valve needle with a portion of the conical face located on the combustion chamber side of the annular groove, wherein the recesses are embodied as a plurality of elongated grooves, and the ends of the elongated grooves facing away from the combustion chamber are located inside the annular groove. Thus, claim 50 is not rendered obvious by the combined teachings of Haeberer et al and Schorr et al.

Claims 35, 38 and 51

Claim 35 depends from claim 25 and further requires that the elongated grooves have a width of 5 μm to 50 μm .

Claim 38 depends from claim 25 and further requires that the depth of the elongated grooves is from 1 to 10 times their width.

Independent claim 51 includes the language "wherein the recesses (35) are embodied as a plurality of elongated grooves (38), wherein the elongated grooves (38) are microscopic grooves, whose depth (t) is less than 50 μm ."

The examiner acknowledges that Haeberer et al does not teach or suggest that the elongated grooves 55 (Fig. 3) have a width of 5 μm to 50 μm or a depth of from 1 to 10 times their width, or are microscopic grooves, whose depth is less than 50 μm .

To solve these deficiencies in Haeberer et al the examiner cites Schorr et al and finds that Schorr et al teaches that the size of grooves formed in a fuel injection valve is a result-effective variable.

The appellants respectfully submit that in order to combine the teachings of Haeberer et al and Schorr et al in the manner suggested by the examiner, one of ordinary skill in the art would have had to ignore most of the teachings in Schorr et al.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

Schorr et al actually teaches a fuel injection valve, including a valve body 1 and a pistonlike element 5. The pistonlike element includes a guide or sealing portion 105 which is guided in a guide bore 103 provided in the valve body. The valve body includes a leak fuel chamber 15 and a high-pressure region or pressure chamber 19. The guide portion of the pistonlike element and the guide bore of the valve housing are disposed between the leak fuel chamber and the high-pressure region. In order to keep the pistonlike element centered within the guide bore 103, the guide or sealing portion 105 of the pistonlike element is provided with recesses which communicate hydraulically with the pressure chamber 19, but do not extend to

the leak fuel chamber 15. To prevent excessive fuel flow through the annular gap between the pistonlike element and the guide bore through the recesses, the cross section of the recesses must be small. Specifically, Schorr et al teaches a recess depth of 1 to 50 μm and a width between 100 and 500 μm . Col. 2, ll. 14-44.

Schorr et al does not teaches recesses or grooves formed at the sealing face 7 of the pistonlike element and, thus, teaches nothing that relates to the grooves 55 taught by Haeberer et al. The examiner has selected a portion of Schorr et al's teachings without regard to the context in which that teaching is made. In other words, the examiner is not considering the reference in its entirety. This is a fundamental error by the examiner which has resulted in the examiner's hindsight reconstruction of the prior art.

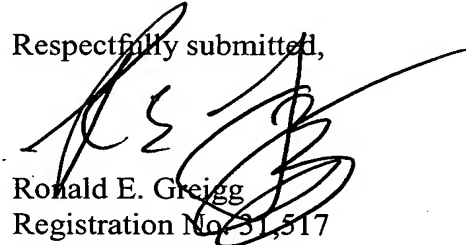
In fact, neither Haeberer et al nor Schorr et al teaches elongated grooves on the sealing face of a needle valve having a width of 5 μm to 50 μm or a depth of from 1 to 10 times their width, or which are microscopic grooves, whose depth is less than 50 μm . Accordingly, none of claims 35, 38 and 51 is not rendered obvious by the combined teachings of Haeberer et al and Schorr et al.

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Conclusion

For the reasons stated above, the appellants request that the Examiner's rejection of the claims be reversed.

Respectfully submitted,



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VIII - CLAIMS APPENDIX

25. A fuel injection valve for internal combustion engines, the valve comprising

a valve body (1) having a bore (3) defined on its end toward the combustion chamber of the engine by a conical valve seat (12),

a pistonlike valve needle (5) disposed longitudinally displaceably in the bore (3), the valve needle (5) having a valve sealing face (10) that includes two conical faces (20; 22), on its end toward the combustion chamber the second conical face (22) disposed on the combustion chamber side of the first conical face (20),

an annular groove (25) extending between the conical faces (20; 22), the end of the annular groove (25) facing away from the combustion chamber acting as a sealing edge upon contact of the valve sealing face (10) with the valve seat (12), and

a plurality of recesses (35) embodied on the valve sealing face (10), the recesses (35) hydraulically connecting the annular groove (25) with a portion of the second conical face (22) located on the combustion chamber side of the annular groove (25), wherein the recesses (35) are embodied as a plurality of elongated grooves (38), and the elongated grooves (38) extend beyond the injection openings (14).

30. The fuel injection valve according to claim 25, wherein all the elongated grooves (38) begin in the same radial plane perpendicular to the valve needle (5) and intersect the annular groove (25), and extend from there in the direction of the combustion chamber.

35. The fuel injection valve according to claim 25, wherein the elongated grooves (38) have a width (b) of 5 μm to 50 μm .

36. The fuel injection valve according to claim 25, wherein the elongated grooves (38) are embodied rectilinearly and extend along the second conical face (22).

38. The fuel injection valve according to claim 25, wherein the depth (t) of the elongated grooves (38) is from 1 to 10 times their width (b).

48. The fuel injection valve according to claim 25, wherein the recesses (35; 38) are produced by a laser process.

50. A fuel injection valve for internal combustion engines, the valve comprising
a valve body (1) having a bore (3) defined on its end toward the combustion chamber of the engine by a conical valve seat (12),

a pistonlike valve needle (5) disposed longitudinally displaceably in the bore (3), the valve needle (5) having a valve sealing face (10) that includes two conical faces (20; 22), on its end toward the combustion chamber the second conical face (22) disposed on the combustion chamber side of the first conical face (20),

an annular groove (25) extending between the conical faces (20; 22), the end of the

annular groove (25) facing away from the combustion chamber acting as a sealing edge upon contact of the valve sealing face (10) with the valve seat (12), and

a plurality of recesses (35) embodied on the valve sealing face (10), the recesses (35) hydraulically connecting the annular groove (25) with a portion of the second conical face (22) located on the combustion chamber side of the annular groove (25),

wherein the recesses (35) are embodied as a plurality of elongated grooves (38),

wherein the end of the elongated grooves (38) facing away from the combustion chamber is located inside the annular groove (25).

51. A fuel injection valve for internal combustion engines, the valve comprising

a valve body (1) having a bore (3) defined on its end toward the combustion chamber of the engine by a conical valve seat (12),

a pistonlike valve needle (5) disposed longitudinally displaceably in the bore (3), the valve needle (5) having a valve sealing face (10) that includes two conical faces (20; 22), on its end toward the combustion chamber the second conical face (22) disposed on the combustion chamber side of the first conical face (20),

an annular groove (25) extending between the conical faces (20; 22), the end of the annular groove (25) facing away from the combustion chamber acting as a sealing edge upon contact of the valve sealing face (10) with the valve seat (12), and

a plurality of recesses (35) embodied on the valve sealing face (10), the recesses (35) hydraulically connecting the annular groove (25) with a portion of the second conical face (22) located on the combustion chamber side of the annular groove (25),

wherein the recesses (35) are embodied as a plurality of elongated grooves (38), wherein the elongated grooves (38) are microscopic grooves, whose depth (t) is less than 50 μm .

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IX - EVIDENCE APPENDIX

None

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X - RELATED PROCEEDINGS APPENDIX

None